**IN THE CLAIMS**

Please amend claims 2-4 and 8-10, and add new claims 14-15 as follows:

2. A computer-based method for prediction of behavior in a financial system using financial return data, the method comprising the steps of:

(a) inputting the financial return data and a set of independent variables corresponding to properties of the financial system into a computer, wherein the financial return data comprises a plurality of data points collected over time;

(b) defining a first subset of independent variables within the set of independent variables comprising a least quantity of independent variables estimated to fit the financial return data;

(c) determining a goodness-of-fit to the measured data according to a selected goodness-of-fit criterion for each independent variable of the first subset of independent variables;

(d) culling each independent variable within the first subset whose presence or elimination fails to change the goodness-of-fit;

(e) defining a next subset of independent variables larger than the first subset of independent variables;

(f) adding the next subset of independent variables to a remaining group of the first subset of independent variables to define a combined group of independent variables;

(g) determining the goodness-of-fit to the financial return data for the combined group of independent variables;

(h) culling each independent variable of the combined group of independent variables whose presence or elimination fails to change the goodness-of-fit;

(i) repeating steps (e) through (h) until the goodness-of-fit to the financial return data meets the selected goodness-of-fit criterion in a final iteration; and

(j) providing an output comprising the combined group of independent variables remaining after the final iteration, wherein the remaining independent variables comprise the smallest subset of independent variables that fits the financial return data. (*amended*)

3. The computer-based method of claim 2, wherein the financial return data comprises daily returns of financial securities, wherein the daily returns have unknown covariances. (*amended*)

4. The computer-based method of claim 3, wherein the daily returns comprise a linear combination of unknown factors and a part that fluctuates independently corresponding to noise, according to the relationship

$$X_\alpha = \sum_{\beta=1}^{k} \Lambda_{\alpha,\beta} f_\beta + N_\alpha ,$$

where α and ß are financial securities, $X_\alpha$ is the daily return for financial security α, $f_ß$ is an unknown factor, $\Lambda_{\alpha,ß}$ is a loading matrix, and $N_\alpha$ is the noise. (*amended*)

8. A system for prediction of behavior in a financial system using financial return data, the system comprising:

a computer having an input for receiving the return data comprising a plurality of data points collected over a period of time and a set of independent variables corresponding to properties of the financial system;

computer software contained within the computer for performing a plurality of iterations, each iteration comprising identifying a subset of independent variables within the set of independent variables and determining a goodness of fit to the measured data according to a selected goodness-of-fit criterion for each independent variable of the subset, eliminating each independent variable within the subset whose presence or elimination fails to change the goodness-of-fit at the predetermined minimum level, and combining, after the plurality of iterations, remaining independent variables to identify the smallest subset of independent variables that fits the financial return data to generate an output;

wherein the plurality of iterations utilizes increasingly larger subsets of independent variables. (*amended*)

9. The system of claim 8, wherein the financial return data comprises daily returns of financial securities, wherein the daily returns have unknown covariances. (*amended*)

10. The system of claim 9, wherein the daily returns comprise a linear combination of unknown factors and a part that fluctuates independently corresponding to noise, according to the relationship

$$X_\alpha = \sum_{\beta=1}^{k} \Lambda_{\alpha,\beta} f_\beta + N_\alpha ,$$

where a and ß are financial securities, $X_a$ is the daily return for financial security a, $f_ß$ is an unknown factor, $\Lambda_{a,ß}$ is a loading matrix, and $N_a$ is the noise. (*amended*)

14. A computer-based method for prediction of behavior in a financial system comprising:

estimating a covariance matrix of the financial system comprising a plurality of variables and a plurality of factors using a subset of the plurality of factors, wherein the subset comprises the minimum number of factors capable of describing the plurality of variables, wherein the subset is selected by iteratively modeling each variable as a linear combination of unknown factors and a noise factor starting with zero factors and adding one factor with each iteration until a model is identified for which no further improvement occurs. (*new*)

15. The computer-based method of claim 14, wherein improvement is determined by a goodness-of-fit criterion comprising a log-likelihood function which is minimized using a conjugate gradient. (*new*)